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entitled (54) **BLOW MOULDING**

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Related Art (59) **Nil**

The following statement is a full description of this invention, including the best method of performing it known
to us:

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L200-58-2D-12P.C.

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This invention relates to blow moulding of containers and, in particular, to blow moulding of plastic liners for preformed cartons.

An object of the invention is to provide a container of the type which incorporates an outer shell (i.e., a carton or drum or the like) and an inner liner, but for which the customary need to first form and then insert the liner into the shell (as a secondary operation) is avoided.

Thus, there is provided in accordance with the present invention a method of forming a product container comprising forming a container shell and blow moulding a plastic material liner into the formed shell, the shell forming at least a portion of the mould cavity for the moulded liner.

The invention also provides a product container when formed by the above defined method. Such a container may be filled with a product and be sealed at any time following its formation. However, in accordance with a preferred feature of the present invention, the container is filled and the liner is sealed prior to the container leaving the blow moulding station. To this end, the blow moulding head may incorporate a nozzle through which the container is charged following the blow moulding operation.

The blow moulding head would normally be employed as a closure for the mould cavity (i.e., for the shell) and, for this purpose, it would fit neatly within an open end of the preformed shell.

The invention has particular application in the

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lining of pre-folded cartons but it is equally applicable to lining (and filling) of cans, drums or other containers which have a defined shape.

The invention will be more fully understood from the following description of a preferred embodiment thereof taken in conjunction with the accompanying schematic drawings, wherein,

Figure 1 is a perspective view of an apparatus for use in the production of lined and filled cardboard cartons, and

Figures 2 to 4 illustrate a moulding/filling head portion of the apparatus during successive operational stages of the apparatus.

As illustrated, the apparatus comprises a primary endless conveyor system 10 which includes a number of spaced holding jaws 11. Each jaw comprises a vertically disposed channel-shaped element which is adapted for receiving and conveying an open carton 12. The holding jaws 11 are conveyed stepwise in succession between a carton receiving station A, which is located below a carton magazine 13, to a carton discharge station B, following which they are returned (stepwise) to the receiving station A.

Flat, pre-glued cartons 12 are loaded in the magazine 13 for successive transfer to the receiving station A, the carton transfer being synchronised with the holding jaw movement. In transferring from the magazine, the carton 12 is opened into its square or oblong configuration (known techniques being employed to effect this operation) and, when located in the holding jaw 11, the

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carton is supported through its still open lower end flaps by a support platform 14.

The primary conveyor 10, together with the holding jaws 11 and opened carton 12, is then advanced to a folding and glueing station C where the lower end flaps of the carton are folded, coated by an applicator with a suitable adhesive, and sealed closed.

The primary conveyor 10 is then further advanced through a further folding station D, where the carton upper end flaps are folded outwardly into an horizontal position, and to a blow moulding and filling station E.

Apparatus of known construction and operation may be employed for performing the steps prescribed at stations C and D.

In the blow moulding station, the sides and bottom walls of the carton (supported by an associated holding jaw 11, platform 14 and a side wall 15 of the platform) form a major portion of a mould cavity.

A retractable blow moulding head 16 is located above the upper level of the carton 12 and, upon the arrival of the carton in the moulding and filling station E, the head 16 is moved downwardly to engage in the upper rim of the carton. The head has a shape conforming with the carton rim and it is preferably tapered to seat in and seal the open (upper) end of the carton. The relationship of the carton 12, when located in the moulding and filling station E, is most clearly illustrated in Figures 2 to 4 of the drawings.

The head 16 incorporates an extrusion orifice or annulus 17 through which a tube of thermoplastic material

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is extruded into the mould cavity (which is defined by the carton 12 and the head 16), an air nozzle or annulus 18 through which pressurised air is delivered to conform the extruded plastic material with the shape of the mould cavity, and a product discharge port 19 through which a product is delivered to charge the blow moulded package, the respective annuli 17, 18 and the port 19 being concentric one with the others. The head is thus arranged and adapted to perform the dual function of lining the interior of the carton and, immediately following solidification of the liner, charging the lined carton with the product it is to contain.

Thus, in reference to Figures 2, 3 and 4 respectively:

Figure 2 shows a carton 12 in position at the moulding and filling station E. The head 16 is closed onto the rim of the carton and a tube of thermoplastics material 20 is extruded through annulus 17 and into the mould cavity defined by the carton and the head 16.

Thereafter, as in Figure 3, extrusion of the plastics material is ceased and pressurised air is introduced into the tube 20 (through annulus 18) to conform the tube with the inner walls of the carton.

The air supply is then cut off, and, following solidification of the plastics material (which now forms a liner for the carton), a product to be contained by the package is introduced via the product discharge port 19. A further (exhaust) port (not shown) permits venting of air within the package during the filling stage.

Figure 4 illustrates the carton within the moulding

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and filling station E, but with the head 16 retracted. Upon retraction of the head 16, opposed crimping/sealing jaw elements 21 close onto the upwardly projecting portion of the liner, the elements 21 operating to sever the end of the liner and, at the same time, to seal both the upper end of the liner and the lower end of a subsequent tube 20.

The extrusion orifice 17, air nozzle 18, and discharge port 19 in the head 16 are connected through conduits 22, 23 and 24 respectively with a source of thermoplastic material 27, a pressurised air source 26 and a product supply source 25. Feed of the various materials is controlled by ancilliary timer operated valves, shown diagrammatically at 28 in Figure 1.

Following charging of the carton and sealing of the liner, the carton is advanced beyond the moulding-filling station to a closing station F where the upper flaps of the carton are closed and glued. Thereafter the complete package is transported via discharge station B to a secondary conveyor 28 for movement to a storage area.

It will be appreciated that the above-described apparatus constitutes but one arrangement for putting the invention into effect and that variations and modifications may be made without departing from the scope of the invention as set forth in the appended claims. For example, the various operations to be performed at the moulding-filling station E might be obtained by employment of a multi-head structure, and sealing of the upper end of the liner may be effected between rollers

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located ahead of the moulding-filling station. Again, moulding of the carton liner may be effected in two stages by an injection - blow moulding technique. That is, a parison may be formed by an injection moulding operation and the parison be then transferred into the carton for blow moulding to the shape of the carton. The expression "blow moulding" herein employed is to be understood as covering this and other (similar) moulding techniques.

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The claims defining this invention are as follows:-

1. A method of forming a product container comprising blow moulding a plastics material liner into a preformed container shell, the shell forming at least a portion of the mould cavity for the liner during the moulding operation.
2. A method as claimed in claim 1 wherein the plastics material liner is blow moulded into a said container shell which is formed from a cardboard or paperboard material.
3. A method as claimed in claim 2 wherein the container shell has end flaps, the flaps at one end of the container shell being closed prior to the blow moulding operation, the flaps at the other end being retained in an open position, and said other end of the container shell being closed during the blow moulding operation by a moulding head.
4. A method as claimed in any one of claims 1 to 3 wherein, prior to the blow moulding operation, the plastics material liner is extruded into the container shell in the form of a tube having one end closed, and wherein, following the extrusion operation, pressurised air is delivered to the tube to expand same into contact with the walls of the container shell.
5. A method as claimed in claim 4 wherein the extruded tube and the pressurised air are delivered via a common moulding head.
6. A method as claimed in any one of claims 1 to 5 wherein, following the blow moulding operation, the lined container shell is charged with a product to be contained by the container, charging of the container being through a moulding head employed in the blow mould-

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7. A method as claimed in claim 6 wherein, following charging of the container, the end of the plastics material liner through which the product is delivered is sealed closed by sealing means associated with the moulding head.

8. A product container formed by the method as claimed in any one of the preceding claims.

9. Container forming apparatus comprising a blow moulding station adapted to receive a preformed container shell, a mould head at the moulding station adapted to locate in and close an open portion of the container shell, a means associated with the mould head for delivering a hollow parison of a plastics material into the container shell, and further means associated with the mould head for delivery of a pressurised fluid into the parison whereby the plastics material is expanded into a mould cavity formed by the container shell and the mould head to line the container shell.

10. Apparatus as claimed in claim 9 including means for delivering to the container shell via the mould head a product to be packaged by the container, and means adapted to delay delivery of the product pending blow moulding and solidification of the plastics material.

11. Apparatus as claimed in claim 10 including means associated with the mould head for closing and sealing the end of the plastics material/liner through which the product is delivered.

12. Container forming apparatus comprising:

(a) an endless conveyor adapted for conveying a preformed cardboard or paperboard carton having end flaps in stepwise movements between a carton receiving station and a blow moulding station;

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(b) means in the conveyor path adapted for closing the flaps at one end of the carton and for holding open the flaps at the other end of the carton, and

(c) a mould head at said moulding station adapted to locate in and close the open end of the carton, means associated with the mould head for delivering a hollow parison of a plastics material into the carton at the moulding station, further means associated with the mould head permitting delivery of pressurised fluid into the parison for expanding the plastics material into a mould cavity formed by the carton and the mould head

(d) means for delivering to the carton via the mould head a product to be packaged by the carton, and

(e) means for closing and sealing the plastics material following delivery of the product to the carton.

13. Container forming apparatus substantially as illustrated in the accompanying drawings and substantially as hereinbefore described with reference thereto.

14. A method of forming a product container substantially as hereinbefore described with reference to the accompanying drawings.

DATED this Thirteenth day of July 1971.

WILMERS & GLADWIN PTY. LIMITED
By their Patent Attorney:

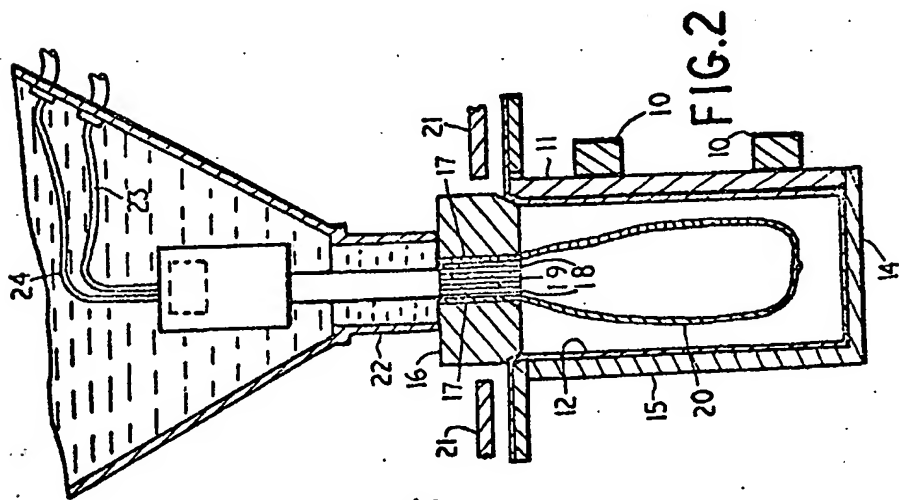
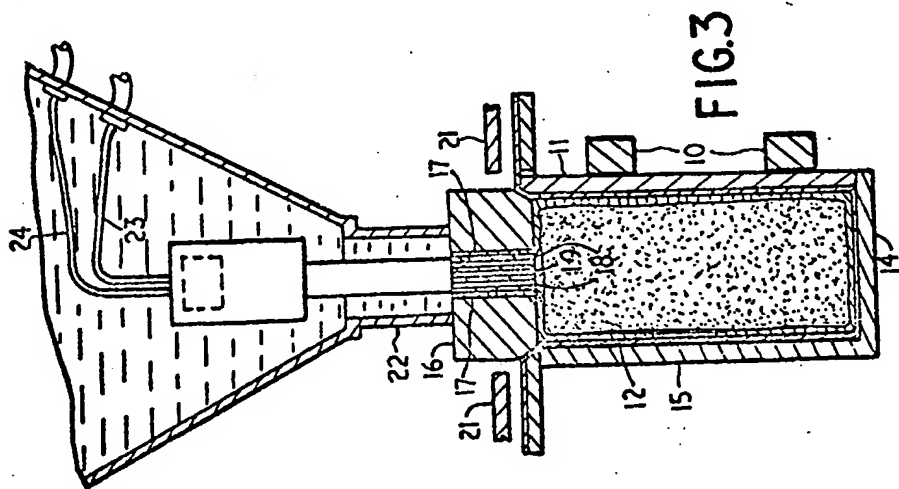
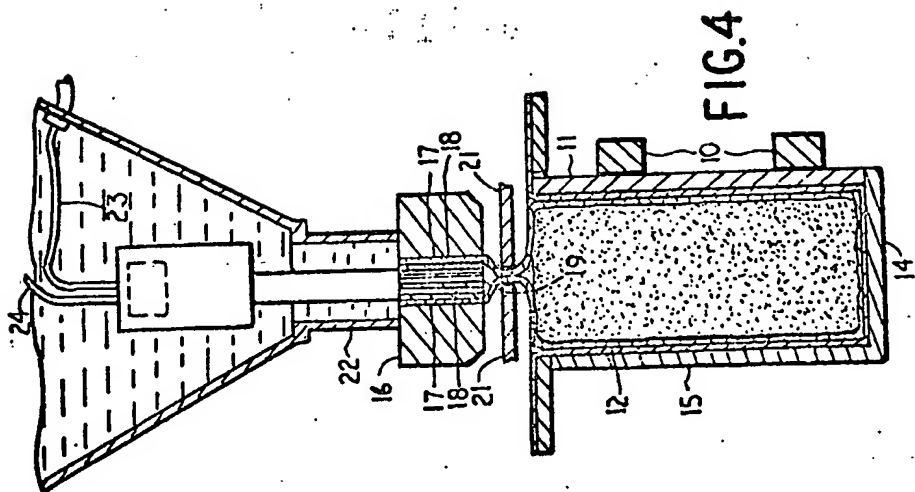


of GRIFFITH HASSEL & FRAZER



FIG. 1

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